# The Collaboration…

The NVSL, CVB, and NADC have unique roles and responsibilities within the USDA. The NVSL is the Department's main diagnostic laboratory and is responsible for national control and eradication programs, the CVB regulates vaccines and diagnostic kits needed for these control programs as well as other diseases of animals, and the NADC serves as the research arm of the USDA providing fundamental research and development of new vaccines and diagnostic procedures that ultimately affect the other units. Co-location of the three units of the USDA at a single facility will only add to the high degree of collaboration that is already present.

A prime example of the collaboration of the three units can be seen with pseudorabies, a disease of swine. The control efforts for this disease center around the use of recombinant vaccines with specific gene deletions and companion diagnostic tests that can differentiate an animal vaccinated with a deleted vaccine from an animal infected with whole virus. Much of the early developmental work with recombinant vaccines was done at the NADC. Vaccine manufacturers in the U.S. applied the technology and the CVB licensed and tested the vaccines and companion diagnostic kits that were developed. The NVSL's role was to standardize the diagnostic testing by requiring training and yearly proficiency exams for the laboratories using the kits and providing test panels for determining the sensitivity and specificity of the kits themselves.

Johne's disease of cattle is another area where the three units are currently working closely together. The NADC has significantly improved the diagnostic test methods for this disease, and these test methods are being utilized by diagnostic laboratories throughout the US. The NVSL certifies the accuracy of these laboratories through the administration of yearly proficiency tests for culturing and serological determinations. Finally, the CVB regulates the commercially available Johne's diagnostic tests as well as the vaccine.

The current gains that have been achieved in eradicating brucellosis and tuberculosis are also a direct result of the close working relationship of the three groups. Presently, research on the utilization of RB51 vaccine in cattle, bison, and elk by the NADC has provided a promising new tool for finally controlling this disease in wildlife thereby reducing the risks of re-introducing the disease into livestock. The vaccine has been licensed by the CVB for use in cattle, and safety and efficacy trials in wildlife are being evaluated by them with testing being provided by the NVSL and NADC. Similar collaborative work is being done with tuberculosis in deer.

**For additional information related to NVSL, CVB, and NADC activities please see the attached pages.**

# Did you know…

- The NVSL in Ames is an international reference laboratory (Office International des Epizooties) for vesicular stomatitis virus, bluetongue, highly pathogenic avian influenza, Newcastle disease, psuedorabies, leptospirosis, contagious equine metritis, equine encephalomyelitis, and equine infectious anemia.

- The NVSL provides laboratory support for national surveys that are conducted each year to determine the relationship between farm management practices and disease prevalence. A typical survey will include the testing of up to 8,000 fecal samples for pathogens and 30,000 serum samples for antibodies to specific diseases. The serum samples are banked for later use with emerging diseases such as West Nile fever. The number of serum samples that are currently being stored for later use exceeds 75,000.

- NADC developed and hosted the first International Virtual Conference via the World Wide Web on the topic of Infectious Diseases of Animals in 1997. The 4,000 attendees made it one of the largest Animal Health Conferences ever held.

- NADC is a major player/contributor to the National Food Safety Initiative begun in 1997. Recent accomplishments include:
    - first to develop instrumentation with potential for rapid detection of manure contamination on carcasses. One of the ways to reduce bacterial contamination of food is to reduce fecal contamination in livestock and poultry slaughter facilities. Every year 6.5 to 33M people in the US get foodborne illnesses costing $6 to $24B.
    - development of rapid assays to detect E. coli O157:H7, multidrug resistant *Salmonella typhimurium* and *Yersinia enterocolitica* in livestock.

- Over 1000 brains from cattle with nervous system signs are tested at the NVSL each year to make certain bovine spongiform encephalopathy (mad cow disease) has not entered the United States. In addition, 2000 to 3000 brains from captive and wild deer and elk are tested each year for chronic wasting disease, a similar disease that affects these species.

- In order to protect the health of U.S. poultry and livestock, animals that are imported into the U.S. are tested at the NVSL to make sure they don't have any foreign animal diseases. Horses make up a large percentage of these animals: approximately 15,000 horses are tested each year.

- The NVSL was the first to isolate West Nile fever virus in the U.S. The virus causes a disease that can be fatal to humans, birds, and horses.

# Did you know…

- NVSL distributes over 6000 sets of avian influenza virus reagents each year enabling state and private diagnostic laboratories to screen approximately 500,000 birds for this disease. The 1983 outbreak of avian influenza costs U.S. producers $86 million and consumers $548 million.

- NADC has developed the following for cattle: an oral vaccine for shipping fever addressing problems costing US cattle producers over $1B annually in animal death, reduced weight gain, etc.; a test for BLAD, a genetic disease which causes immune deficiency and early death in Holsteins (without this test, an estimated 40,000 calves could die each year with a potential value of $10M); nutritional supplements to reduce milk fever, a metabolic disease which costs dairy producers $150M annually.

- NADC accomplishments in swine include: recent development of a “next generation” vaccine for porcine reproductive and respiratory syndrome (PRRS), a viral disease characterized by fetal death, abortions, and severe respiratory illness in piglets which is estimated to cost U.S. pork producers more than $100 million annually; development of the first vaccine to prevent porcine parvovirus-induced reproductive failure in swine (The vaccine is still used extensively today and has essentially eliminated a disease that was estimated at the time of vaccine development to cost U.S. pork producers more than $50 million annually).

- The US Veterinary Biologics Program has been in existence since 1913. This is prior to the existence of FDA and regulation of human vaccines.
    - Over 70 billion doses of vaccines, bacterins, toxoids, antibody products, and diagnostic test kits are released to the manufacturers for marketing in the US each year by CVB to protect the health of US food and companion animals, including fish, birds, and mammals.
    - CVB is the sole regulator of such veterinary products marketed in the US, ensuring the public of their quality. There are over 2500 different animal vaccines for over 250 diseases licensed by CVB, compared to 24 diseases for human vaccines. All of these vaccines are produced by private manufacturers according to CVB-enforced standards to assure purity, safety, potency, and efficacy.
    - Twelve firms producing over 80% of livestock vaccines are located within 200 miles of Ames IA and CVB. A single service location in proximity to manufacturers facilitates technology transfer, observation of animal trials, and face-to-face communication. Communication with stakeholders is similarly aided.
    - CVB licensed the first live genetically engineered vaccine in the US (human or non-human) for control and eradication of pseudorabies in swine in the US. Assuring the public that such genetically modified organisms (GMO’s) are safe and effective involves environmental risk assessment and publication, inspection of facilities, and testing efficacy and safety in biocontainment.